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IS 3330 (1988): Wool-cotton Vests [TXD 10: Hosiery]



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*Indian Standard*  
SPECIFICATION FOR  
WOOL-COTTON VESTS  
( *Second Revision* )

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR WOOL-COTTON VESTS

( *Second Revision* )

### 0. FOREWORD

**0.1** This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards on 25 April 1988, after the draft finalized by the Hosiery Sectional Committee had been approved by the Textile Division Council.

**0.2** This standard was originally published in 1965 and revised in 1978 to specify the grade of wool tops, tolerance on mass of individual vest and replacement of requirement of scouring efficiency by scouring loss. In the second revision, the mass of individual vest has been increased by five percent, sewing thread specified for stitching of shoulder pieces, neck opening, etc, has been brought in line with present trade practices, and percentage of wool and cotton in the vest has

also been standardized along with tolerance on the same.

**0.3** This standard is based on IND/TC 1527 (f) 'Specification for vests woollen, white', issued by the Ministry of Defence, Government of India.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

\*Rules for rounding off numerical values ( *revised* ).

### 1. SCOPE

**1.1** This standard prescribes the constructional details and other particulars of plain-knitted round neck wool-cotton vests with sleeves, scoured or bleached.

NOTE — The description 'wool-cotton' indicates that vests are made with worsted and cotton yarn, the former used in the face of the fabric and the latter plaited at the back of the fabric.

**1.2** This standard does not specify the general appearance, feel, type of finish, etc, of the vests ( *see also 4.4* ).

### 2. MATERIALS

**2.1 Worsted Yarn** — The worsted yarn used for knitting vests shall be spun from 58s grade wool tops ( *see Note 1* ). The approximate count of yarn shall be 40 tex ( Nm 25 ) and shall have a minimum single thread breaking load of 1 250 mN ( 125 g ) ( *see Note 2* ).

NOTE 1 — 58s grade wool tops shall conform to IS : 5911-1977\*.

NOTE 2 — The breaking load of yarn shall be determined on a test length of 500 mm using a constant rate of traverse type machine having a traverse of  $300 \pm 15$  mm per minute.

\*Specification for fineness grade of wool tops ( *first revision* ).

NOTE 3 — The breaking load values of yarn removed from the vests shall not be less than 95 percent of the specified values.

**2.2 Cotton Yarn** — The cotton yarn used in plaiting of vests shall be evenly spun. The approximate Count shall be 18s cotton count ( 32 tex ) and shall have a minimum single thread breaking load of 2 250 mN ( 225 g ) ( *see Note 2 under 2.1* ).

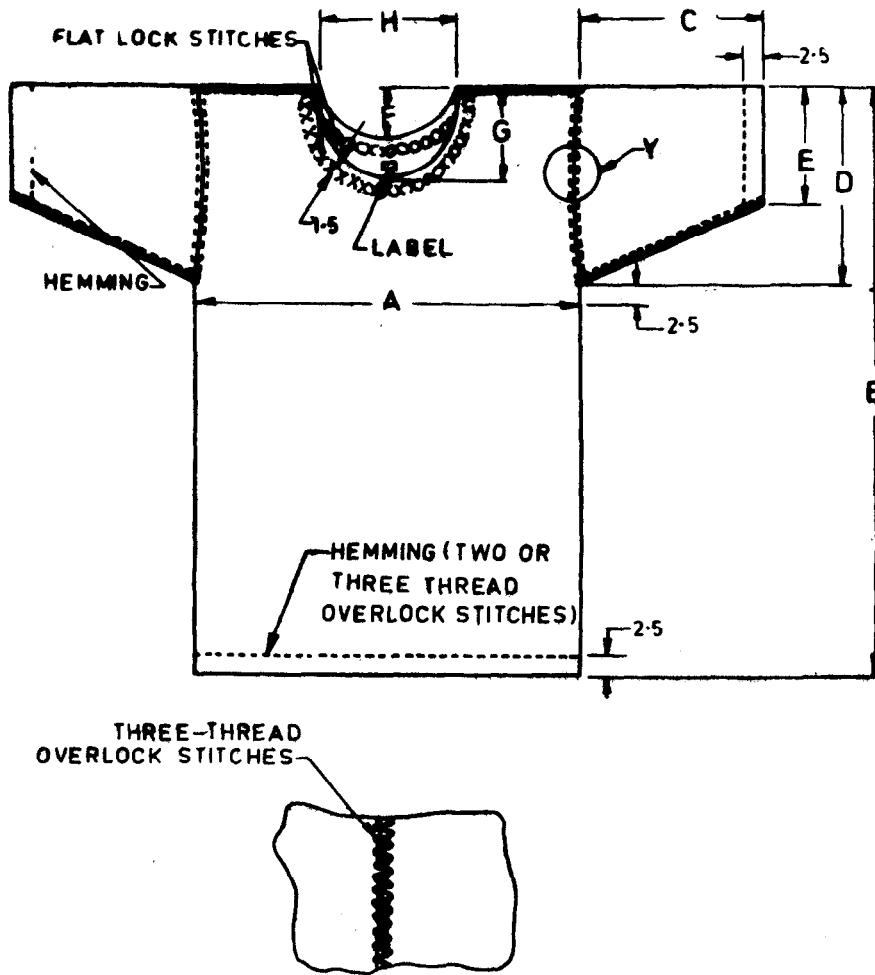
### 3. MANUFACTURE

**3.1** The shape of vests shall generally be as shown in Fig. 1. The vests shall be tailored neatly out of well and evenly knitted tubular fabric, knitted in plain stitches with worsted yarn on the face of the fabric and cotton yarn plaited inside. The wales shall run along the length of the vest. The body and the sleeves of vest shall be made out of the same fabric.

#### 3.2 Seams and Stitches

**3.2.1** For stitching various portions of vests, the type of stitch and count of sewing thread shall be as given in Table 1. The sewing thread shall conform to IS : 1720-1978\*.

\*Specification for cotton sewing thread ( *first revision* ).



ENLARGED  
DETAIL AT Y (INSIDE)

All dimensions in millimetres.

FIG. 1 WOOL-COTTON VEST

TABLE 1 SEAMS AND STITCHES

(Clause 3.2.1)

Sl. No.	PORTION TO BE STITCHED	TYPE OF STITCH	COUNT OF SEWING THREAD	
			In Needle(s)	In Looper(s)
(1)	(2)	(3)	(4)	(5)
i)	All joinings (seaming of sleeves and joining sleeves with body)	Three-thread overlock	24s/3 (250 dtex × 3)	24s/3 (250 dtex × 3) in primary looper, and 40s/2 (145 dtex × 2) in secondary looper
ii)	Shoulder pieces, neck opening, etc	Flat-lock	4 strands of viscose rayon yarn of 300 denier (33 tex)	
iii)	All hemmings	Two-thread overlock or Three-thread overlock	24s/3 (250 dtex × 3)  24s/3 (250 dtex × 3)	40s/2 (145 dtex × 2)  24s/3 (250 dtex × 3) primary looper, and 40s/2 (145 dtex × 2) in secondary looper

**3.2.2** The stitches shall be of even tension throughout and all the loose ends securely fastened off. The number of stitches shall not be less than 5 per centimetre. The seams and joins shall withstand stretching in all directions to the full extent of the knitted fabric.

#### 4. REQUIREMENTS

**4.1 Dimensions and Mass** — The vests shall conform to the requirements of Table 2 read with Fig. 1.

**4.2** The vests shall also conform to the requirements as given in Table 3.

**4.3** The cotton yarn used for manufacture of

vests shall be free from visible imperfections such as kitties. The vests shall be free from the objectionable flaws. The objectionable flaws shall be those which strike immediately the eyes and shall be deemed to include:

- a) Appearance of cotton yarn on the face of the fabric;
- b) Noticeable broken thread in the body;
- c) Large mends;
- d) Ladders;
- e) Dropped stitches;
- f) Noticeable oil or other stains;
- g) Holes, cuts or tears extending beyond 6 mm square in area;

**TABLE 2 DIMENSIONS AND MASS OF WOOL-COTTON VESTS**

( Clause 4.1 )

SIZE	WIDTH ACROSS CHEST	LENGTH OF THE VEST	LENGTH OF THE SLEEVES	WIDTH OF ARM HOLE	WIDTH OF OPEN- ING OF SLEEVE	NECK-OPENING			MASS PER 10 VESTS (see NOTE), Min
						Depth at Back	Depth at Front	Width	
	A	B	C	D	E	F	G	H	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	cm	cm	cm	cm	cm	cm	cm	cm	g
80	40.0	63	22	23	13.0	6.0	10	16	2 090
85	42.5	67	22	23	13.5	6.0	10	16	2 380
90	45.0	71	23	24	14.0	6.5	10	17	2 700
95	47.5	74	23	24	14.5	6.5	10	17	2 750
100	50.0	76	24	25	15.0	7.0	12	18	3 000
105	52.5	79	24	25	15.0	7.0	12	18	3 130
110	55.0	81	25	26	16.0	7.5	13	19	3 370
115	57.5	84	26	28	16.0	7.5	13	19	3 630
Tolerance	±1.0	±2	±1	±1	±1.0	±0.5	±1	±1	—
Method of Test	A-2	A-2	A-2	A-2	A-2	A-2	A-2	A-2	A-3

NOTE — A tolerance of minus 5 percent shall be permissible in the mass of an individual vest calculated on the basis of mass specified in col 10, provided that the minimum collective mass of 10 vests is maintained.

**TABLE 3 REQUIREMENTS OF WOOL-COTTON VESTS**

( Clause 4.2 )

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST
(1)	(2)	(3)	(4)
i)	Composition:		
	a) Wool, percent	55 ± 2	
	b) Cotton, percent	45 ± 2	
ii)	Wales/dm	80 ± 4	A-4
iii)	Courses/dm	100 ± 4	
iv)	Dimensional change (due to relaxation) percent, Max	5.0	A-5 A-6
v)	pH value of aqueous extract:		
	a) Worsted yarn	5.0 to 7.5	IS : 2006-1978*
	b) Cotton yarn	6.0 to 8.0	
vi)	Scouring loss, percent, Max:		A-7
	a) Worsted yarn	4.0	
	b) Cotton yarn	3.0	

\*Methods for quantitative chemical analysis of binary mixtures of protein fibres and certain other fibres (first revision).

- h) Missed stitches at the stitched portion; and
- j) Any other defect which may significantly mar the appearance or serviceability.

**4.4 Sealed Sample** — If, in order to illustrate or specify the indeterminable characteristics, such as general appearance, feel and type of finish, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

**4.4.1** The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

## 5. MARKING

**5.1** A suitable cloth label shall be securely attached to each piece on the inside of the neck-opening (back side) on which the following shall be marked:

- a) Name of the material, namely, wool-cotton vest;
- b) Size;
- c) Manufacturer's name, initials or trade-mark, if any; and
- d) Any other information as required by the buyer.

**5.1.1** The vests may also be marked with the Standard Mark.

**NOTE** — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 6. PRESERVATION

**6.1** The vest shall be preserved with a heavy dose of naphthalene, using a minimum quantity of 5 kilogram per cubic metre of the volume of the bale.

## 7. PACKING

**7.1** The vests of the same size shall be packed

in bales in accordance with IS : 2518-1964\* or IS : 3355-1966†, as the case may be.

**7.2** Alternatively, the vests may be packed by the method given below, when specifically agreed to between the buyer and the seller:

10 vests of the same size and shape, suitably folded, shall be tied with twine or string to form a bundle. Five such bundles shall be wrapped with an inner layer of polyethylene film of minimum 40 microns ( see IS : 2508 -1984‡ ) or kraft paper ( see IS : 1397-1967§ ) and an outer layer of heavy cee cloth ( see IS : 3751-1966|| ) or equivalent hessian cloth to form a rectangular bale, weighing approximately 35 kg. The over-laps of the inner layer shall be at least 10 cm to ensure full protection of the contents of the bale. The over-laps of the outer layer of heavy cee cloth or hessian shall be such that it can be properly and securely sewn around the bale. The bale shall be stitched with double 3-ply jute twine taking care not to pierce inner wrappings during stitching. The number of stitches shall not be less than 12 per decimetre. Heavy cee cloth or hessian shall be pulled out at each corner to form ears of about 15 cm in length. The bale shall be made secure by fastening with at least 2 bands of steel strips or wire in each direction along the length and width of the bale.

## 8. SAMPLING

**8.1 Lot** — A consignment of vests of the same size, delivered to a buyer against a despatch note shall constitute a lot.

**8.1.1** The conformity of the lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from it.

**8.2** Unless otherwise agreed between the buyer and the seller, the number of vests, depending upon the size of the lot, shall be selected at random in accordance with col 2 of Table 4.

\*Code for seaworthy packaging of wool hosiery yarn and goods.

†Code for inland packaging of wool hosiery yarn and goods.

‡Specification for low density polyethylene films ( second revision ).

§Specification for kraft paper ( first revision ).

||Specification for heavy cee cloth.



**8.3** The sample size and criteria for conformity for each of the characteristics shall be as follows:

<i>Characteristics</i>	<i>Sample Size</i>	<i>Criteria for Conformity</i>
Dimensions, number of wales and courses and freedom from defects	All the vests selected according to col 2 of Table 4	Non-conforming vests not to exceed the corresponding number given in col 3 of Table 4
Mass	All the sets of 10 vests made from those selected according to col 2 of Table 4	Each observed value to satisfy the specified requirement
Fibre composition, specification for wool tops, dimensional change, pH value of aqueous extract and scouring loss	All the vests selected according to col 4 of Table 4	Non-conforming vests not to exceed the corresponding number given in col 5 of Table 4

**TABLE 4 NUMBER OF VESTS TO BE SELECTED FROM A LOT AND PERMISSIBLE NUMBER OF NON-CONFORMING VESTS**

( Clauses 8.2 and 8.3 )

NUMBER OF VESTS IN THE LOT	NON-DESTRUCTIVE TESTING		DESTRUCTIVE TESTING	
	Number of Vests to be Inspected	Permissible Number of Non-conforming Vests	Number of Vests to be Inspected	Permissible Number of Non-conforming Vests
(1)	(2)	(3)	(4)	(5)
Up to 300	10	1	2	0
301 to 500	20	1	3	0
501 to 1 000	30	2	5	0
1 001 to 3 000	50	3	8	0
3 001 and above	80	5	13	1

## APPENDIX A

### METHODS OF TEST

( Tables 2 and 3 )

#### A-1. CONDITIONING OF TEST SPECIMENS AND ATMOSPHERIC CONDITIONS FOR TESTING

**A-1.1** The test specimens shall preferably be conditioned before testing and tested in the standard atmosphere as given in IS : 6359-1979\*.

#### A-2. DIMENSIONS

**A-2.1** Take a vest from the test sample. Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Measure correct to the nearest millimetre the dimensions given in Table 2.

#### A-3. MASS

**A-3.1** Take a set of 10 vests from the test sample. Condition them to moisture equilibrium for 24 hours ( see A-1.1 ) and weigh to an accuracy of 10 g.

#### A-4. WALES AND COURSES

**A-4.1** Take a vest constituting the test sample. Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. Count with the help of a pick glass or magnifying glass, the number of wales and courses per decimetre at five different places and calculate the average.

#### A-5. DIMENSIONAL CHANGE ( DUE TO RELAXATION )

**A-5.1 Marking of Test Specimens** — Take a vest from the test sample. Mark centrally on it by means of indelible ink or a fast dyed cotton sewing thread an area  $15 \times 15$  cm with two of its sides running in the direction of wales and the other two in the direction of courses. Spread this test specimen on a flat smooth surface, carefully removing by hand all creases and wrinkles. Within this area, mark six pairs of marks, three pairs each in the direction of wales and courses in such a way that the distance between each pair of marks is the same.

\*Method for conditioning of textiles.

## A-5.2 Procedure

**A-5.2.1** Place test specimen on a glass plate and carefully remove by hand all creases and wrinkles without stretching the test specimen and place another glass plate on the test specimen. Measure correct to the nearest millimetre the distance between each pair of marks separately.

**A-5.2.2** Lay the test specimen flat in a tray of suitable size and soak the specimen under a head of 25 mm of water containing 0.5 percent suitable wetting agent at room temperature for 2 hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface. Remove the excess water with the help of absorbent material or by keeping the smooth surface in a sloping position. Dry the specimen at room temperature.

NOTE — Removal of excess water by wringing the test specimen is not permissible.

**A-5.2.3** After drying, condition the test specimen to moisture equilibrium at the room temperature. Place it on the glass plate, carefully remove all wrinkles and creases, and place another glass plate on the test specimen. Measure, correct to the nearest millimetre, the distance between each pair of marks separately.

## A-5.3 Calculation

**A-5.3.1** Calculate, separately, the percentage of dimensional change for each pair of marks in the directions of wales and courses by the following formula:

$$Sr = \frac{100 \times (a - b)}{a}$$

where

$Sr$  = dimensional change (due to relaxation), percent;

$a$  = distance between a pair of marks (along the wales or courses as the case may be) before soaking; and

$b$  = distance between the same pair of marks after soaking.

**A-5.3.2** Determine the average dimensional change (due to relaxation) in each direction.

## A-6. pH VALUE

**A-6.1 Test Specimens**—Take a vest from the test sample. Cut the bottom portion. Taking an

end of any one of the cut and frayed loops, unravel the worsted and cotton yarn separately. Continue unravelling till about 10 g of worsted and cotton yarn are accumulated. Collect the yarn so removed separately into convenient bundles. These bundles shall constitute the test specimens.

**A-6.2 Procedure** — Determine the pH value of worsted yarn and cotton yarn separately by the method given in IS : 1390-1984\*.

## A-7. SCOURING LOSS

**A-7.1 Test Specimens** — Follow the method given in A-6.1.

### A-7.2 Procedure

#### A-7.2.1. Worsted Yarn

**A-7.2.1.1** Dry the test specimen to constant mass in the drying oven at  $105 \pm 3^\circ\text{C}$  and determine its mass accurately.

NOTE — Constant mass shall be deemed to have been reached if the difference between the two successive weighings at an interval of 20 minutes is less than 0.05 percent.

**A-7.2.1.2** Extract the above specimen with a mixture of benzene and methyl alcohol in the proportion of 3 : 2 in a Soxhlet apparatus for 4 hours at the rate of 5 extractions per hour, by placing the specimen in a thimble and covering it with cotton wool previously extracted with the above stated mixture. The solvent shall then be distilled off from the extract. Dry the residue to a constant mass (see Note under A-7.2.1.1) at  $105 \pm 3^\circ\text{C}$  and determine the mass accurately.

**A-7.2.1.3** Calculate the scouring loss of worsted yarn by the following formula:

$$\text{Scouring loss, percent} = \frac{100 a}{b}$$

where

$a$  = mass of the dry residue (see A-7.2.1.2), and

$b$  = mass of the test specimen (see A-7.2.1.1).

**A-7.2.2 Cotton Yarn** — Determine the scouring loss of test specimen by following the procedure prescribed in IS : 1383-1977†.

\*Methods for determination of pH value of aqueous extracts of textile materials (first revision).

†Methods for determination of scouring loss of cotton textile materials (first revision).